

Kumomi. Applicants respectfully traverse these rejections with respect to the amended claims.

None of the applied references teach or suggest the features of independent claims 27, 29, 31, 33, 36, 39, 42, 45 and 47 including: disposing a metal containing material that is capable of promoting crystallization of a semiconductor film where the concentration of the metal is  $1 \times 10^{19}$  atoms/cm<sup>3</sup>. (claims 27, 29, 31, 33, 36, 39 and 42); and disposing nickel in contact with a selected region wherein a concentration of the nickel in said first region is  $1 \times 10^{19}$  atoms/cm<sup>3</sup> or lower (claims 45 and 47). Rather, Oka discloses that the heat treatment time is shortened by increasing crystal growth speed by approximately 10 times by doping with a concentration of approximately  $10^{19} - 10^{25}$  atoms/cm<sup>3</sup> with such impurities as phosphorous (please see the translation at page 13, line 19-22). That is, the concentration is not applied to a metal catalyst as recited in the independent claims for crystallization such as Ni, Fe, Co, Pd, Pt in the present invention and Al, Cr, Ni, Mo, W, Au, Pt and Ti in Oka (page 14 of the translation), but to the crystallization speed growing material such as phosphorous. None of the remaining applied references remedy the deficiencies of Oka. Applicants respectfully request withdrawal of this rejection.

Regarding newly added claims 67-75 which recite either a metal or nickel having a concentration of more than  $1 \times 10^{15}$  atoms/cm<sup>3</sup>, the Office Action states that the claimed nickel concentration is an obvious range in view of the teachings of Oka. However, Oka teaches a method to obtain catalytic action without inducing abnormal metal diffusion. Although, Oka discloses eliminating the metal layer in order induce the abnormal diffusion of the metal into the amorphous silicon, the meaning of an "abnormal diffusion" and the influence of the diffusion on the characteristics of the semiconductor device are not clear. By contrast, the embodiments of the present invention are directed to controlling a nickel adding amount and an adding portion in order to form a thin film having a crystallinity of desired crystal configuration and a desired portion. More specifically, the specification clearly teaches the critical nature of nickel concentration that when the concentration is more

than  $5 \times 10^{19}$  atoms/cm<sup>3</sup>, Nisi is locally produced and causes a loss of the semiconductor characteristics. Also, while Oka appears to suggest the result of utilizing excess metal (the abnormal diffusion), the specification teaches the case of insufficiency of the metal that when the nickel concentration is less than  $1 \times 10^{15}$  atoms/cm<sup>3</sup>, the action as a catalyst for the crystallization decreases. Thus, Applicants respectfully submit that the specification discloses the criticality of the concentration of the metal in view of the catalytic effect and the characteristics of the semiconductor device and that the criticality is an inherent feature of the concentration recited in new claims 67-75.

In view of the foregoing amendments and remarks, Applicants respectfully submit that the application is in condition for allowance. Prompt reconsideration and allowance are earnestly solicited.

Should the Examiner believe that anything further is desirable in order to place the application in condition for allowance, the Examiner is invited to contact the undersigned attorney listed below.

Respectfully submitted,

  
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